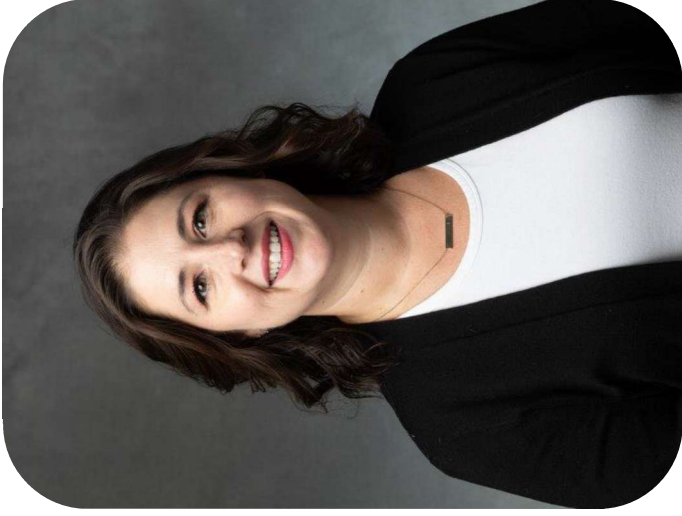


The STEM Connection: Bridging Disciplines Through Design Challenges

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Introductions



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Engineering is...

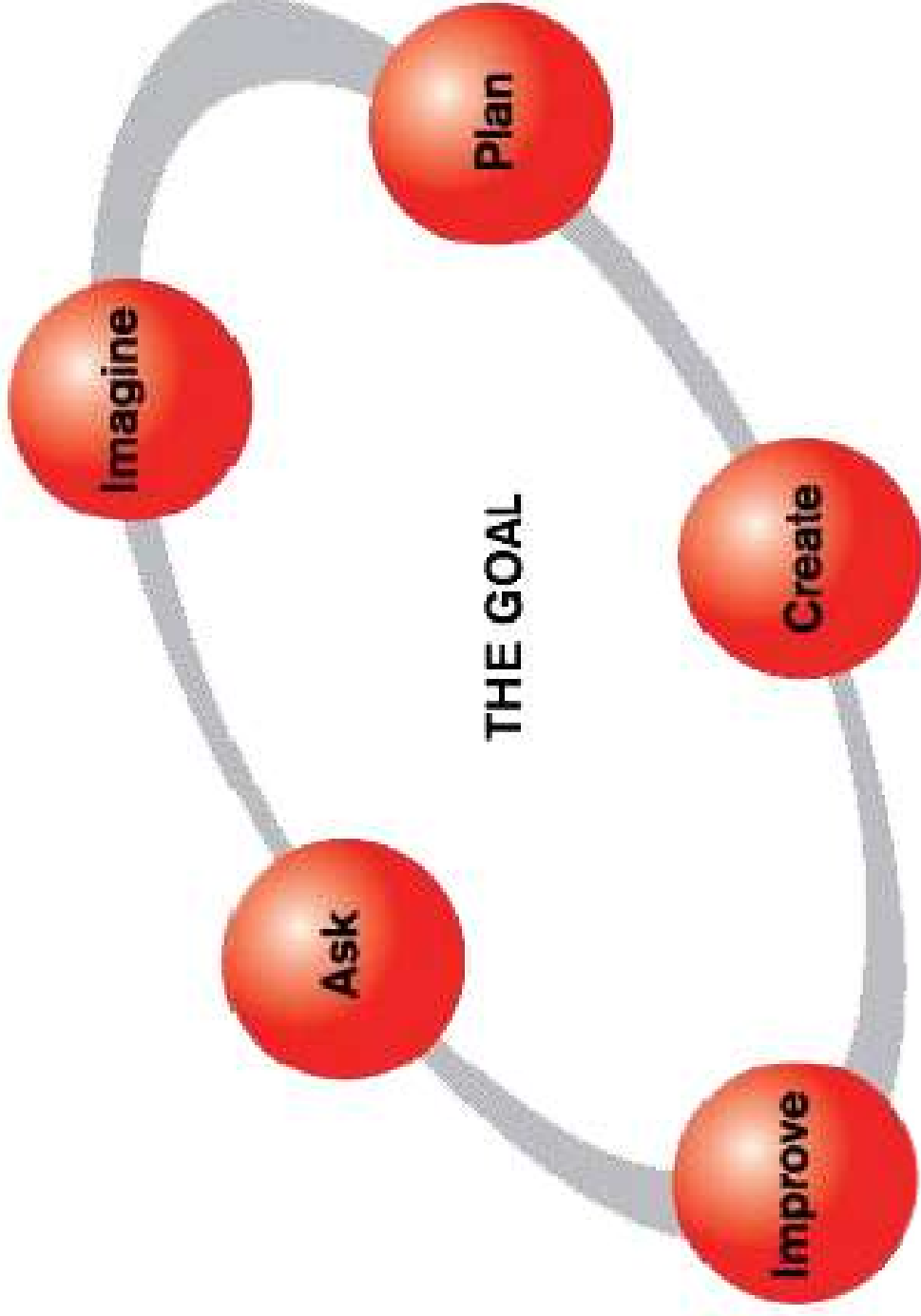
A major difference between science and engineering is that scientists deal with the world that is, while engineers envision the world that could be.



Theodore von Kármán



Engineering Design Process



Integrated STEM – Why Teach It?



- Combining more than one subject into one learning experience.
- Teaches the 4 Cs and helps students identify as engineers.

Collaboration

Critical Thinking

Communication

Creativity

Why Integrate STEM Through Engineering



- Solving a problem or need
- Using design constraints
- Competition vs. Challenge
- Why is failure important?
- As teachers, we can use low-cost materials to teach these concepts

Catapults



Catapult Materials:

- 1 spoon
- Rubber bands
- Popsicle sticks
- Small launch object
- Protractor or angle guide
- Ruler
- Target circle



Need building inspiration?

Catapults - Explore



Launch Distance:

- A catapult launches an object by storing and releasing energy.
- The distance the object travels may depend on different variables.
 - Spoon angle (measure angle between base and spoon)
 - Pull-back height (measured height between table/base and spoon when pulled down to load)



Catapults - Explore

- You will collect data, look for patterns, and decide how to improve your catapult for maximum distance.

Testing Spoon Angle:

Spoon Angle (degrees)	# of popsicle sticks for height	Trial 1 Distance	Trial 2 Distance	Trial 3 Distance	Average Distance

Testing Pull Back Height:

# of popsicle sticks	Pull-Back Height (cm)	Trial 1 Distance	Trial 2 Distance	Trial 3 Distance	Average Distance

Catapults - Results



Findings:

- How does the spoon angle affect the distance the object travels?
 - High angle = more distance
- How does the pull-back height affect the distance the object travels?
 - Higher pull back = more vertical
- What changes would you make to create maximum distance?

Catapults - Challenge Two



Accuracy Challenge:

- Your goal is to launch the object into a target circle placed at a fixed distance.
- Use what you learned about release angle and pull back height to make your catapult as accurate as possible.
- What combination of release angle and pull back height helps you land closest to the target?
- Target distance: 3 ft.

Reflect

- What did you learn from this challenge?
- What connections can you make to other content, concepts, and/or challenges?



Want to Learn More?

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- Fall registration open
- Funding available



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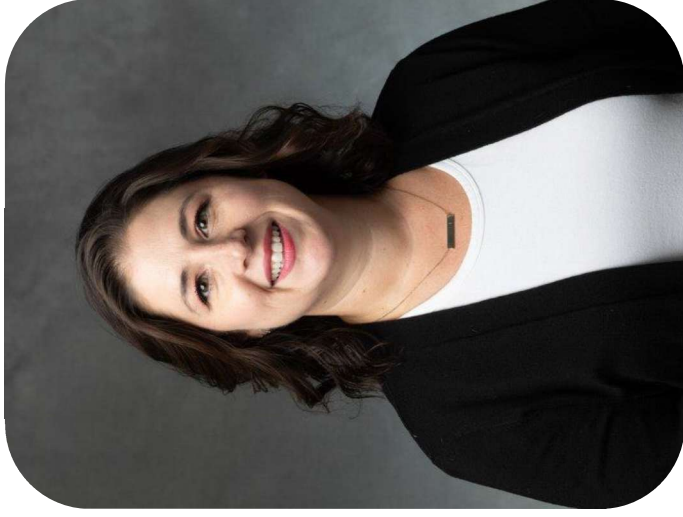
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Thank You!

Questions? Please contact us



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